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Title : COMPOSITION OF KILLER WHALE (Orcinus orca) SKIN AND BLUBBER: IMPLICATIONS FOR FATTY ACID SIGNATURE ANALYSIS

Category : Ecology

Student : Not Applicable

Preferred Format : Poster Presentation

Abstract : Foraging ecology of many marine mammals is poorly understood because of the inherent difficulties in studying them in their natural environment. Increasingly, fatty acid signature analysis of blubber is being used to evaluate diet preferences; therefore it is important to fully understand the biochemical composition of this tissue. The purpose of this study was to describe the characteristics of killer whale blubber, with the goal of ultimately applying this information to explore the feeding ecology of this species. Blubber and skin samples were obtained from fresh-dead killer whales (n=8). The entire blubber depth was collected and subsequently divided into skin plus six equal sections. Gross lipid and water content of each layer was determined and fatty acid composition analyzed. Statistical analyses consisted of univariate and multivariate techniques, including classification and regression tree (CART) analysis. Blubber and skin separated into three groupings during CART analysis for all animals. Skin separated completely from all blubber layers and outer layers (A, B, C) were distinct from inner layers (D, E, F). Lipid class data indicated that, while blubber is composed primarily of triglycerides (74 - 98%), there are substantial quantities of wax esters in the skin and blubber layers A and B (5.0 - 25.0%). Gross lipid content was low in layer A (˜50%) but increased to ˜72% lipid in layers B - F. Water content averaged less than 20% across layers B - F. Fatty acid composition of blubber and skin changed dramatically with depth for several saturated, monounsaturated, and polyunsaturated fatty acids. Further investigation is required to determine whether this species has true layering or if a discontinuous gradient is present through the blubber. Changes in fatty acid composition could be a result of the different roles that blubber plays in marine mammals, including buoyancy, thermoregulation, structural support, and energy storage.